



Practitioner's Docket No.: P.19503/MAJR

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: HARVEY, et al.

Application No.: 10/088,511

Group No.: 1722

Filed: 08/14/2002

Examiner: Rao, G. Nagesh

For: STABLE FERRIC ARSENATE PRECIPITATION FROM ACID COPPER SOLUTIONS
WHILST MINIMISING COPPER LOSSESMail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

DECLARATION UNDER 37 C.F.R. ' 1.132

1. I, David William Dew, am currently employed as the Director of Research, at the Johannesburg Technical Centre of BHP Billiton SA Limited, a company that operates within the mining industry ("the Company"). I have been employed with the Company since 1984 and I have held my current position since 1 MARCH 2006.
2. I hold the following educational and professional qualifications
BSc (HONS), Ph.D., MIMM, C.ENG.
The fields in which I have scientific and technical expertise, and within which I have conducted research, include MINERAL BENEFICIATION, BIOLEACHING
[Insert as much background about your qualifications as possible, i.e. education, professional degrees, areas of expertise and research, etc.]
3. Paul Harvey is a co-inventor of the subject matter of US patent application No. 10/088,511. Whilst employed with the Company as a PRINCIPAL ENGINEER Paul Harvey would report to and receive instructions from me. As a result, I oversaw and received feedback regarding all aspects of his research leading to the invention which forms the subject of the patent application.
4. Paul Harvey is no longer in the employment of the Company and, as a consequence, I am deposing to this declaration.
5. As a result of my educational qualifications, my employment history and my specific and relevant scientific and technical knowledge and expertise generally and my knowledge of the subject matter of this application and the research that led to the invention, I submit that I am duly qualified to make the following submissions.

6. In the response to the Office Action that was mailed on December 13, 2006, I am hereby submitting a paper directed to a laboratory study that was conducted by Paul Harvey in September 1999 (Attachment A). Generally speaking, the study shows that copper loss through co-precipitation is minimized when the method of the present invention is carried out. The study shows, at 85°C (FIG. 6 in Attachment A) and 60°C (FIG. 7 in Attachment A) respectively, using lime as the neutralizing agent, that between pH 1.5 and pH 2.2, copper removal remains minimal whilst arsenic and iron removal is high. Figures 6 and 7 correspond with batch tests B6 and B7, respectively. The batch test results were used to conduct a series of continuous neutralization tests, which better emulate the practical environment. Continuous neutralization tests C4 and C5 were conducted using the same solutions as batch tests B6 and B7. The results of the continuous neutralization tests show (Table 7), at pH set points of 2.15 and 2.25 that:
- 1) for test C4 (85°C), only 1.54% of the copper is removed whilst 54.9% of the arsenic is removed; and
 - 2) for test C5 (60°C), only 0.43% of the copper is removed whilst 60.2% of the arsenic is removed.
7. It is known that washing reduces copper co-precipitation. Therefore, it may be expected that more favourable results would occur had results been obtained after washing.
8. The results of tests C4 and C5 also support another advantage of the invention, i.e. the method is equally effective at temperatures as low as 60°C. The advantage of this is that at temperatures just above 85°C, in high altitude locations such as Chile, the boiling point of water is being reached. Numerous technical and economic difficulties are posed by the design of a plant capable of working at temperatures close to boiling point.
9. The advantage of using a two-step process of neutralizing agent addition is that it provides better pH control. By adding the neutralizing agent in a step-wise manner, localized areas of relatively high pH are avoided and thus copper co-precipitation in these high pH localities is reduced. Furthermore, better nucleation of the arsenate precipitate, and better seed material, result from the step-wise addition of the neutralizing agent.
10. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date:

19 April 2007
Signature
David William Dew